

Disc player

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Inventor: TSUNODA NORIO (JP); YANO HIDEO (JP)

Applicant: ASAHI TSUSHO KK (JP)

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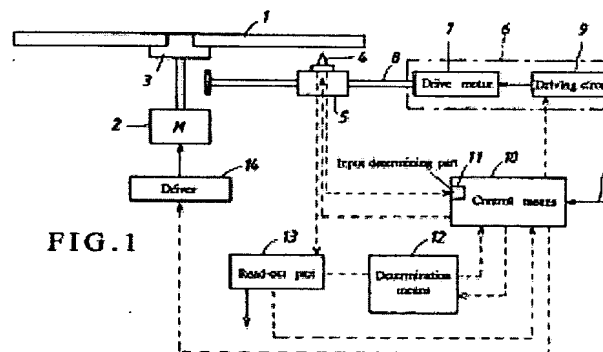
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A light pickup 4 is adapted to receive reflected light from a disc 1 and to input a signal into a determination means 12 while moving in the radial direction of the disc 1. The determination means 12 not only determines the current position of the light pickup but also calculates the time required for the light pickup 4 to move until reaching the signal-recording inner circular end of the disc, on the basis of the signal from the light pickup. The determination means 12 determines that no disc is set when there is no reflected light from the disc. The determination means 12 determines the size of the diameter of the disc 1 on the basis of the current position of the light pickup 4. The disc player has a structure in which it is not necessary to provide a switch for detecting the signal-recording inner circular end of the disc, a sensor for detecting the size of the diameter of the disc and a sensor for detecting whether or not the disc is set.



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Disc player

Description of corresponding document: **EP0729147**

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a disc player capable of conducting a playback of a disc memory medium (hereinafter referred to as "disc") for use in CD, LD, MD, CD-ROM, MO and the like. More particularly, the present invention is concerned with a disc player having unnecessitated a switch for detecting the signal-recording inner circular end of the disc, etc., to thereby enable simplifications of the structure and control thereof.

Discussion of Related Art

Generally, the disc player achieves a playback by having a light pickup read disc information upon the input of initialization signal. This playback is conducted by the move of the light pickup from the signal-recording inner circular end to the circumference of the disc in the radial direction of the disc. Therefore, the light pickup not only should reach the signal-recording inner circular end of the disc but also should detect the arrival at the signal-recording inner circular end prior to reading of information.

For meeting the above requirement, a switch capable of mechanically or optically detecting light pickup is disposed at a site inside the conventional disc player which corresponds to the signal-recording inner circular end of the disc, and the arrival of the light pickup at the signal-recording inner circular end of the disc is determined on the basis of the signal detected by the detection switch. Further, the disc player is provided with a set detecting sensor capable of checking the setting of the disc on the turn table and with a diameter determining sensor capable of detecting the size of the diameter of the disc, thereby having a structure capable of preventing malfunctions.

The conventional disc player is provided with the detection switch for detecting the arrival of the light pickup at the signal-recording inner circular end of the disc, so that not only is its structure complex but also it is required to accurately arrange the detection switch, thereby rendering the assembly thereof timeconsuming. Moreover, the playback of the disc is conducted in accordance with the detection signal from the detection switch, so that not only is the control system complex but also appropriate detection signal cannot be outputted, for example, when the detection switch is in trouble or has suffered from dislocation. In this instance, there occur disadvantages such as the failure to playback the disc or the malfunctioning. In addition, the conventional disc player needs the sensor for detecting the setting of the disc, the sensor for determining the diameter of the disc, etc., which further renders the structure complex and renders the control system complicated.

SUMMARY OF THE INVENTION

The present invention has been made under the above circumstances.

It is therefore an object of the present invention to provide a disc player which unnecessitates a switch for detecting the move of the light pickup to the signal-recording inner circular end of the disc, thereby enabling not only simplifications of the structure and control system thereof but also prevention of malfunctioning.

It is another object of the present invention to provide a disc player which unnecessitates a sensor for detecting the setting of the disc, a sensor for determining the diameter of the disc, etc.

The foregoing and other objects, features and advantages of the present invention will become apparent from the following description and appended claims taken in connection with the accompanying drawings.

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Brief Description of the Drawings

In the drawings:

Fig.1 is a block diagram showing one embodiment of the present invention;

Fig.2 is a plan of a disc; and

Fig.3 is a flow chart showing operations conducted according to one embodiment of the present invention.

Detailed Description of the Invention

Essentially, according to the present invention, there is provided a disc player comprising:
a light pickup capable of emitting laser beam toward a disc and receiving laser beam reflected thereby;
a drive means for moving the light pickup in the radial direction of the disc;
a control means adapted to have an initialization signal inputted therein for controlling the light pickup and the drive means so that the light pickup is moved at a constant speed in the radial direction of the disc while emitting laser beam by the input of initialization signal; and
a determination means for having, inputted therein, a signal fed from the light pickup while the light pickup is moving in accordance with the initialization signal, calculating a time required for the light pickup to move until reaching at least a signal-recording inner circular end of the disc on the basis of the inputted signal and outputting the calculated time to the control means.

In the above structure, the input of initialization signal causes the control means to control the drive means, so that the light pickup moves in the radial direction of the disc while emitting laser beam toward the disc. The laser beam emitted from the light pickup is reflected by the disc and received by the light pickup. The signal produced as a result of the receipt of laser beam is inputted in the determination means. The determination means calculates the time required for the light pickup to move until reaching the signal-recording inner circular end of the disc on the basis of the above data, and the control means causes the light pickup to move on the basis of the calculated time. Thus, the light pickup certainly reaches the signal-recording inner circular end of the disc. In the above structure the light pickup's reaching the signal-recording inner circular end is attained only by the signal from the light pickup, thereby unnecessitating a detection switch and enabling simplification of the control system.

In the present invention, the control means executes a control for the light pickup to temporarily move toward the circumference of the disc at an early stage of the input of initialization signal and thereafter executes a control for the light pickup to move toward the signal-recording inner circular end of the disc in accordance with the result of determination of the determination means. The position of the light pickup is not known at an early stage of the input of initialization signal, so that the light pickup is caused to temporarily move toward the circumference of the disc. When the light pickup does not receive reflected light (signal) from the disc for a given period of time during the above move toward the circumference or the signal-recording inner circular end of the disc, this is the instance in which the disc is not set on the turn table. In this instance, the determination means determines that the disc is not yet set. Therefore, it is not necessary to dispose a detection sensor for detecting whether or not the setting of the disc is carried out.

On the other hand, when the disc receives reflected light from the disc during the temporary move of the light pickup toward the circumference of the disc or the subsequent move thereof toward the signal-recording inner circular end of the disc, the determination means detects the setting of the disc and simultaneously determines the current position of the light pickup on the basis of the signal from the light pickup. Further, the determination means compares the thus determined current position of the light pickup with the previously set diameter of the disc and determines the size of the diameter of the disc on the basis of comparison result. Therefore, it is not necessary to provide a sensor for determining the diameter of the disc.

Effect of the Invention

As apparent from the foregoing, in the present invention, the light pickup is moved toward the signal-recording inner circular end of the disc on the basis of the signal thereof produced while moving the light pickup in the radial direction of the disc. Therefore, it is not necessary to provide a switch for detecting the

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signal-recording inner circular end of the disc, so that the structure of the disc player is simplified to thereby not only minimize apparatus trouble and malfunctioning but also simplify the control system. Moreover, the diameter of the disc and/or the setting of the disc can be detected by the signal produced while moving the light pickup. Therefore, it is not necessary to provide sensors for detecting these, so that the structure and control system of the disc player can be further simplified.

Preferred Embodiment of the Invention

The present invention will be illustrated in greater detail with reference to the following Example, which should not be construed as limiting the scope of the invention.

Example

Fig.1 shows the configuration of one embodiment of the present invention.

A turn table 3 is secured to the rotating shaft of a disc motor 2. A disc 1 is set on the turn table 3. The lower side of the disc 1 is a signal recording surface. A light pickup 4 adapted to emit laser beam toward the signal recording surface is arranged below the disc 1.

The light pickup 4 is secured to a movable carriage 5 and is capable of not only emitting laser beam toward the disc 1 but also receiving laser beam reflected by the disc 1 to thereby convert the same to an electrical signal. The movable carriage 5 reciprocates at a constant speed in the radial direction of the disc 1, so that also the light pickup 4 reciprocates integrally therewith in the same direction at a constant speed. These reciprocating movements are carried out by the driving of a drive means 6.

In the illustrated example, the drive means 6 is provided with a drive motor 7 such as a servomotor, a feed screw 8 secured to the drive motor 7 and adapted to rotate and a driving circuit 9 capable of controlling the driving of the drive motor 7. The feed screw 8 passes through the movable carriage 5 in threadedly engaging relationship. Thus, normal and reverse rotations of the feed screw 8 cause the movable carriage 5 to reciprocate at a constant speed in the radial direction of the disc 1. In this instance, the functioning of the driving circuit 9 is controlled by the below described control means 10. Further, the drive means 6 is not limited to the illustrated structure as long as the light pickup 4 can be moved in the radial direction of the disc 1. For example, another structure can be employed in which use is made of a pulley and a timing belt to thereby convert the driving power of the drive motor to the moving power of the light pickup.

The light pickup 4 is connected via a connection member such as a flexible cable (not shown) to the control means 10. The control means 10 controls the emission of laser beam toward the disc 1. The light pickup 4 converts light reflected by the disc 1 to an electrical signal and outputs it to the control means 10 at an early stage of the input of initialization signal A to the control means 10. Numeral 11 denotes an input determination part in which an electrical signal based on the above reflected light is inputted and which constitutes a part of a determination means 12 described later.

Numeral 13 denotes a read-out part in which the electrical signal from the light pickup 4 is inputted and which reads information recorded on the disc 1 on the basis of this electrical signal. The read information is fed to a playback element (not shown) where the information is played back. The read information is outputted to the determination means 12 in advance, namely, prior to the information playback.

The determination means 12 determines the current position of the light pickup 4 relative to the disc 1 with the input of read signal from the read-out part 13, calculates the time required for the light pickup 4 to move until reaching the signal-recording inner circular end of the disc 1 as described later on the basis of the thus determined current position data and outputs the time to the control means 10. The control means 10 controls the drive motor 7 by means of the driving circuit 9 on the basis of the outputted time to thereby move the light pickup 4 toward the signal-recording inner circular end of the disc 1. Thus, the state of initialization is terminated, and the normal reading of the disc 1 is started.

In addition to the above function, the determination means 12 determines the size of the diameter of the disc 1 from the data of the current position of the light pickup 4 as described later. The control means 10 outputs a control signal to a driver 14 of the disc motor 2 to thereby control so as for the disc 1 to rotate at a given number of revolutions and outputs the number of revolutions to the determination means 12.

The operation of the disc player having the above structure according to this Example will be described

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below. Fig. 2 shows the disc 1 and numeral 1a denotes the signal-recording inner circular end of the information recording part on which information has been recorded. The light pickup 4, prior to the start of disc playback, reaches the signal-recording inner circular end 1a of the disc 1 and thereafter moves in the radial direction toward the circumference of the disc 1. During the move, the light pickup 4 reads the information of the disc 1. Numeral 1b denotes the circumferential edge of disc with a small diameter (e.g., diameter of 8 cm) and numeral 1c the circumferential edge of disc with a large diameter (e.g., diameter of 12 cm). Mirror parts 1d, 1e having no information recorded thereon are respectively provided on the signal-recording inner circular end sides of the circumferential edges 1b, 1c of the discs with the above diameters. Information recording parts 1f, 1g are provided on the further signal-recording inner circular end sides of the mirror parts 1d, 1e. Incidentally, numeral 1h is a set hole formed at the center of the disc 1.

Fig. 3 is a flow chart showing operations conducted at the time of initialization according to this Example. This flow chart not only moves the light pickup 4 toward the signal-recording inner circular end of the disc 1 but also determines whether or not the disc 1 is set on the turn table 3 and the size of the diameter of the set disc 1. This flow chart is started when the initialization signal A has been inputted in the control means 10 and the disc motor 2 is rotated at a given number of revolutions on the basis of the initialization signal A.

The control means 10 outputs a control signal to the light pickup 4 so as to cause the light pickup 4 to emit laser beam (step S1). Then, the control means 10 outputs a control signal to the driving circuit 9 so that the movable carriage 5 is temporarily moved toward the circumference of the disc 1 so as to move the light pickup 4 integrally therewith in the same direction (step S2). The move toward the circumference of the disc 1 at an early stage of the input of the initialization signal is conducted for a given period of time (e.g., 0.5 Sec). After this move, the light pickup 4 conducts a focus search and the signal thereof is outputted to an input determining part 11 of the control means 10 (step S3).

The input determining part 11 determines whether or not the reflected light from the disc 1 is incident on the light pickup 4 on the basis of that signal (step S4). This step S4 does not read the information recorded on the disc 1 but determines only whether or not the light pickup 4 receives the reflected light from the disc 1. When the light pickup 4 receives the reflected light from the disc 1, an advance is made to step S5. On the other hand, when the light pickup 4 does not receive the reflected light, an advance is made to step S6.

The step S6 determines whether or not the state of not yet receiving the reflected light from the disc 1 is continued for a given period of time. When the state of not yet receiving the reflected light has been continued for a given period of time or longer, the input determining part 11 determines that the disc 1 is not set on the turn table 3 and, in accordance with this determination, the control means 10 outputs a warning to that effect, terminates the state of initialization and waits for the input of next initialization signal (step S7). This structure detects whether or not the disc 1 is set on the basis of the signal from the light pickup 4, so that a sensor for detecting whether or not the setting is effected is rendered unnecessary. Thus, the number of parts can be reduced, the structure of the disc player can be simplified and the control thereof can be facilitated.

On the other hand, when the reflected light from the disc 1 is received within a given period of time, the input determining part 11 determines that the disc 1 is set on the turn table 3. Thus, the control means 10 moves the light pickup 4 toward the signal-recording inner circular end of the disc 1 (step S8), and the step returns to Step 3 and goes to Step S5.

The Step S5 is a step subsequent to having found that the disc 1 is set on the turn table 3. The control means 10 brings a focus servo of the light pickup 4 to the state of being on. Thereafter, in step S9, other servo controls such as a tracking servo and a servo of disc motor are brought to the state of being on.

The above servo control being brought to the state of being on enables the light pickup 4 to read the information recorded on the disc 1, and whether or not the reading of the information is feasible is determined by the determination means 12 (step S10). In this stage, the signal of the light pickup 4 is outputted to the read-out part 13 and the result is outputted from the read-out part 13 to the determination means 12. When the read-out part 13 has read the information of the disc 1 on the basis of the signal of the light pickup 4, the step goes to step S12. On the other hand, when the read-out part 13 does not read the information, the step goes to step S11. When the read-out part 13 does not read the information of the disc 1, the light pickup 4 is not on the position corresponding to the information recording part 1f or 1g of the disc 1, namely, is at the site corresponding to the mirror part 1d or 1e. Thus, the control means 10 further moves the light pickup 4 toward the signal-recording inner circular end of the disc 1 (step S11) and the step returns to the step S10.

On the other hand, when the information of the disc 1 has been read in the step S10, the determination

[illegible]

means 12 determines the current position of the light pickup 4 relative to the disc 1. This determination is conducted as follows when the disc 1 is CD. Illustratively, in CD, the read information includes information on time, so that the current position of the light pickup 4 is calculated from the information on time.

The step goes after determination of the current position of the light pickup 4 relative to the disc 1 to step S13, in which whether or not the determination of the diameter of the disc 1 is required is decided. When it is required, the step goes to step S17. On the other hand, when it is not required, the step goes to step S14. The step S14 is an instance in which the diameter of the disc 1 has already been inputted or only the disc 1 with a single diameter is employed. In either instance, the diameter of the disc 1 is data already known. In the step S14, the determination means 12 calculates the time required for the light pickup 4 to move until reaching the signal-recording inner circular end of the disc 1. This operation is executed by calculating the time proportional to the result thereof on the basis of the data of the current position of the light pickup 4 relative to the disc 1, which current position has been determined in the step S12. The determination means 12 outputs the thus calculated moving time to the control means 10. The control means 10 controls the driving circuit 9 on the basis thereof and moves the light pickup 4 toward the signal-recording inner circular end of the disc 1 just for that time (step S15). Thus, the light pickup 4 reaches the signal-recording inner circular end 1a of the disc 1, so that the state of initialization is terminated (step S16) with the result that the playback of the information of the disc 1 is started.

On the other hand, when the determination of the diameter of the disc 1 is required, the step goes to step S17. In the step S17, the determination means 12 compares the data of the current position of the light pickup 4 having been determined in the step S12 with m which is the data of circumferential position of the disc with the minimum diameter among the disc varieties employed in the disc player. When the data of current position is found to be greater than m as a result of this comparison, the determination means 12 determines that use is made of a disc with large diameter (step S18). Thereafter, the step goes to the step S14.

In contrast, when the data of the current position of the light pickup 4 is smaller than m , the step goes to step S19. In the step S19, the determination means 12 executes the arithmetic operation (m - the current position) on the basis of the data of the current position of the light pickup 4 and the value of m , calculates the moving time proportional to the result of the arithmetic operation and outputs the calculated time to the control means 10. Thus, the control means 10 controls the driving circuit 9 to thereby move the light pickup 4 toward the circumference of the disc 1 just for that time (step S20). The input determining part 11 determines whether or not the light pickup 4 has received the reflected light from the disc 1 as a result of this move toward the circumference of the disc 1 (step S21). When the reflected light is received, the determination means 12 determines that the disc 1 has a large diameter (step S18). On the other hand, when the light pickup 4 does not receive the reflected light from the disc 1, the determination means 12 determines that the disc 1 has a small diameter (step S22). Thus, the diameter of the disc 1 is determined, so that the step goes from the step S18 and step S22 to the step S14, the same arithmetic operation as above is conducted and thereafter the light pickup 4 moves to the signal-recording inner circular end of the disc 1 (step S15), thereby terminating the state of initialization (step S16).

Therefore, in this Example, the light pickup can securely reach the signal-recording inner circular end of the disc wherever it is located. Thus, it is not necessary to provide a detection switch for detecting the arrival at the signal-recording inner circular end of the disc, so that not only is the structure of the disc player simplified but also the assembly thereof is facilitated. Further, in this Example, the size of the diameter of the disc is also determined, so that it is not necessary to provide a determination sensor therefor, thereby attaining a further simplification of the structure of the disc player.

The present invention is never limited to this Example and various modifications can be made. For example, in this Example, the structure of the disc player can satisfactorily be simplified by moving the light pickup to the signal-recording inner circular end of the disc, so that the determinations of the diameter of the disc and the setting of the disc can be avoided.

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Disc player

Claims of corresponding document: **EP0729147**

1. A disc player comprising:
a light pickup capable of emitting laser beam toward a disc and receiving laser beam reflected thereby;
a drive means for moving the light pickup in the radial direction of the disc;
a control means adapted to have an initialization signal inputted therein for controlling the light pickup and the drive means so that the light pickup is moved at a constant speed in the radial direction of the disc while emitting laser beam by the input of initialization signal; and
a determination means for having, inputted therein, a signal fed from the light pickup while the light pickup is moving in accordance with the initialization signal, calculating a time required for the light pickup to move until reaching at least a signal-recording inner circular end of the disc on the basis of the inputted signal and outputting the calculated time to the control means.
2. The disc player according to claim 1, wherein the control means is adapted to control the drive means so that the light pickup is temporarily moved toward a disc circumference at an initial stage of the input of the initialization signal.
3. The disc player according to claim 1, wherein the determination means is adapted to determine that no disc is set when no signal is inputted thereinto for a given period of time from the light pickup during the temporary move of the light pickup effected by the control means toward the disc circumference.
4. The disc player according to claim 3, wherein the determination means is adapted to make the determination on the basis of whether or not the light pickup is receiving reflected light from the disc.
5. The disc player according to claim 1, wherein the determination means is adapted to determine whether or not the light pickup is located at a position corresponding to an information recording part of the disc on the basis of the signal from the light pickup.
6. The disc player according to claim 1, wherein, when the light pickup is determined as locating at the position corresponding to the information recording part of the disc in accordance with claim 5, the determination means is adapted to determine a current position of the light pickup relative to the disc on the basis of the signal from the light pickup and thus to determine the size of the diameter of the disc on the basis of the determined value.
7. The disc player according to claim 4 or 5, wherein the determination means is adapted to make the determination on the basis of whether or not the information recorded on the disc can be read.

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[71]申请人 株式会社朝日

地址 日本东京都

[72]发明人 角田则夫 矢野秀夫

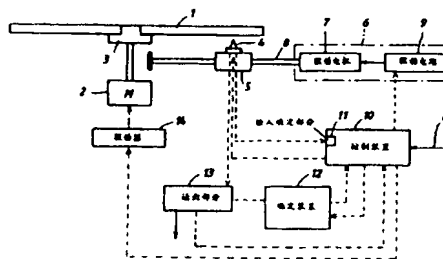
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[54]发明名称 盘唱机

[57]摘要

当沿盘 1 的径向移动时, 光拾取器 4 接收盘 1 的反射光并输入一个信号到确定装置 12。根据光拾取器的信号, 确定装置 12 不但确定光拾取器的当前位置而且还计算其移动到盘的信号记录内圆边缘所需要的时间。当不存在来自盘的反射光时确定装置 12 确定没有设置盘。确定装置 12 根据光拾取器 4 的当前位置确定盘 1 的直径尺寸。在该盘唱机中不必设置用于检测盘的信号记录内圆边缘的开关和用于检测盘的直径尺寸及检测是否设置盘的传感器。



(BJ)第 1456 号

权 利 要 求 书

1、一种盘唱机,包括:

光拾取器,能够发射激光光束到盘并接收盘反射的激光光束;

驱动装置,用于沿盘的径向移动光拾取器;

控制装置,具有输入其中的用于控制光拾取器和驱动装置的启动信号,从而通过输入启动信号在光拾取器发射激光光束时沿盘的径向以恒定速度移动;和

确定装置,当光拾取器根据启动信号移动时,该装置具有输入其中的光拾取器反馈,并根据输入的信号计算光拾取器移动到至少一个盘的信号记录内圆边缘所需的时间及将计算的时间输出到控制装置。

2、根据权利要求1所述的盘唱机,其中控制装置用于控制驱动装置使光拾取器在输入启动信号的初始阶段暂时移动到盘圆周。

3、根据权利要求1所述的盘唱机,其中由控制装置使光拾取器暂时移动到盘圆周期间,在给定的一段时间内没有来自光拾取器的信号输入确定装置时,确定装置用于确定未设置盘。

4、根据权利要求3所述的盘唱机,其中确定装置根据光拾取器4是否接收盘的反射光束作出确定。

5、根据权利要求1所述盘唱机,其中确定装置根据光拾取器

的信号确定光拾取器是否定位在对应盘的信息记录部分的位置。

6、根据权利要求1所述的盘唱机,其中,根据权利要求5当光拾取器被确定为定位在对应盘的信息记录部分的位置时,确定装置根据光拾取器的信号确定光拾取器相对盘的当前位置并根据确定值从而确定盘的直径尺寸。

7、根据权利要求4或5所述的盘唱机,其中确定装置根据记录在盘上的信息是否能被读出来作出确定。

说明书

盘 唱 机

本发明涉及能够将用于 CD、LD、MD、CD-ROM、MO 和类似盘的盘存储介质(下文称之为“盘”)进行重放的盘唱机。特别是,本发明涉及不必具有用于检测盘的信号记录内圆边缘的开关的盘唱机,由此可以简化其结构和控制。

一般说来,一旦启动信号输入,盘唱机通过光拾取器读盘的信息来完成重放,这种重放通过沿盘的径向移动光拾取器从信号记录内圆边缘到盘的圆周来进行,因此,光拾取器不仅应该到达盘的信号记录内边缘而且还应该在读信息之前在记录内边缘检测到达的信号。

考虑到上述要求,一个能够机械或光学地检测光拾取器的开关设置在传统的 CD 唱机内部与盘的信号记录内圆边缘相对应的一个位置上,并且根据检测开关检测到的信号确定光拾取器到达盘的信号记录内圆边缘。此外,盘唱机具有检测在转盘上盘的设置的设置检测传感器及能够检测盘的直径尺寸的直径确定传感器,由此具有能够防止故障的结构。

传统的盘唱机具有检测光拾取器到达盘的信号记录内圆边缘

的检测开关,这样不仅使其结构复杂而且还需要精确地安装检测开关,从而造成消耗在装配的时间增加。此外,根据检测开关的检测信号进行盘的重放,这样不仅使其控制系统复杂而且不能输出适当的检测信号,例如,检测开关发生故障或处于错位时,在这种情况下,发生不能重放盘或故障的缺陷,另外,传统的盘唱机需要检测盘的设置的传感器,及确定盘直径的传感器等,这使其结构复杂及控制系统复杂。

在上述情况下,完成本发明。

本发明的目的是提供不必设置用于检测光拾取器移动到盘的信号记录内圆边缘的开关的盘唱机,从而不仅简化其结构和控制系统而且也能防止故障。

本发明的另一目的是提供不必具有用于检测盘设置的传感器,及确定盘的直径的传感器等的盘唱机。

结合相应的附图通过下面的描述和所附的权利要求,本发明的前述及其他目的,特征和优点将变得显而易见。

图1是表明本发明的一个实施例的方块图;

图2是盘的平面图;和

图3是在本发明的一个实施例进行操作的流程图;

根据本发明,基本上,所提供的盘唱机包括:

光拾取器,能够发射激光光束到盘和接收盘反射的激光光束;

驱动装置,用于沿盘的径向移动光拾取器;

控制装置,具有输入其中的用于控制光拾取器和驱动装置的启动信号,这样通过输入启动信号在光拾取器发射激光光束时光拾取器以恒定速度沿盘的径向移动;和

确定装置,当光拾取器根据启动信号移动时,确定装置具有输入其中的光拾取器反馈的信号,根据输入信号,确定装置计算光拾取器移动到盘的至少一个信号记录内圆边缘所需的时间并将计算的时间输出到控制装置。

在上述结构中,启动信号的输入使控制装置控制驱动装置,这样当发射激光光束到盘时,光拾取器沿盘的径向移动。光拾取器发射的激光光束被盘反射并被光拾取器接收。将接收激光光束所产生的信号输入到确定装置,确定装置根据上述数据计算光拾取器到达盘的信号记录内圆边缘所需的时间,控制装置根据所计算的时间使光拾取器移动。这样,光拾取器一定可以到达盘的信号记录内圆边缘。在上述结构中,仅通过光拾取器的信号使光拾取器到达信号记录内圆边缘,不需要检测开关从而简化控制系统。

在本发明中,控制装置在输入启动信号的早期阶段中执行使光拾取器暂时移动到盘的圆周的的控制,在其后根据确定装置的确定结果执行光拾取器移动到盘的信号记录内圆边缘的控制。在输入启动信号的早期阶段中,不知道光拾取器的位置,因此光拾取器暂时移向盘的圆周。在上述的移向盘的圆周或信号记录内圆边缘的期间,当拾取器在一定期间内没有接收盘的反射光束(信号)时,这是盘没有放在唱盘的情况。在这种情况下,确定装置确认盘仍未被放置。因此,不必安装一个用于检测盘设置是否完成的检测传感器。

另一方面,在光拾取器暂时移到盘的圆周或继续移到盘的信号记录内圆边缘的期间,当光拾取器接收盘的反射光束时,确定装置检测盘的设置并同时根据光拾取器的信号确定光拾取器的当前位置,此外,确定装置将这样确定的光拾取器的当前位置和在前设置的盘

的直径进行比较,并且根据比较结果确定盘的直径尺寸。从而不必提供用于检测盘的直径的传感器。

如上所述,在本发明中,光拾取器沿盘的径向移动时,根据由此产生的信号,移至盘的信号记录内圆边缘。因此,不必提供用于检测盘的信号记录内圆边缘的开关,这样简化盘唱机的结构,从而不但将装置故障和错误动作降至最低程度而且简化控制系统。此外,当移动光拾取器时,由产生的信号可以检测盘的直径和/或盘的设置,因此不必提供用于检测这些情况的传感器,这样可以进一步简化盘唱机的结构和控制系统。

本发明的优选实施例。

参考下面限定本发明范围的实施例,详细说明本发明。

图1表示本发明的一个实施例的构成。

转盘3固定在盘电机2的转动轴上。盘1设置在转盘3上。盘1的下侧面是信号记录面。用于发出激光光束到信号记录面的光拾取器4安装在盘1的下面。

光拾取器4固定在可移动支架5并且不仅可以发出光束到盘1而且还接收盘1反射的光束从而将同样的激光光束转变为电信号。可移动支架5沿盘1的径向以恒定速度往复运动,使光拾取器4随后沿同样的方向以恒定速度整体作往复运动。这种往复运动通过驱动装置6的驱动完成。

在说明的例子中,驱动装置6固定在例如伺服电机的驱动电机7上,馈送丝杠8设置在驱动电机7并且用于转动,驱动电路9能够控制驱动电机7的驱动。馈送丝杠8以螺纹啮合关系通过可移动支架5。这样,馈送丝杠8的正转和反转使可移动支架5沿盘1的径向以

恒定速度往复运动。在这种情况下,通过下文描述的控制装置来控制驱动电路 9 的作用。此外,只要光拾取器可以沿盘 1 径向移动,驱动装置 6 不限定为所说明的结构。例如,可以利用由一个滑轮和一个同步皮带组成的另一种结构,从而将驱动电机的驱动能量转化为光拾取器的移动能量。

光拾取器 4 经连接件如活动电缆(未示出)连接到控制装置 10,控制装置 10 控制光束到盘 1 的发射。光拾取器 4 将盘 1 反射的光转化为电信号并且在输入启动信号 A 到控制装置 10 的早期阶段中将其输出到控制装置 10。数字 11 为输入确定部分,在其中输入了基于上述反射光的电信号,它还构成下文描述的确装置的一部分。

数字 13 为将来自光拾取器 4 的电信号输入其中并根据该电信号读出盘 1 上所记录的信息的读出部分。读出信息馈送给信息被重放的重放元件(未示出)。读出信息预先,即在信息重放之前输出到确定装置 12。

确定装置 12 通过输入读出部分 13 的读信号确定光拾取器 4 相对于盘 1 的当前位置,确定装置 12 根据这样确定的当前位置数据计算下文描述的光拾取器 4 移动到盘 1 的信号记录内圆边缘所需的时间并将这个时间输出到控制装置 10。控制装置 10 根据输出时间通过驱动电路 9 控制驱动电机 7 从而将光拾取器 4 移动到盘 1 的信号记录内圆边缘。这样,结束启动阶段,开始盘 1 的正常读出。

除上述功能以外,确定装置 12 根据下文描述,从光拾取器 4 的当前位置数据确定盘 1 的直径尺寸。控制装置 10 输出控制信号到盘电机 2 的驱动器 14 从而控制盘 1 以给定的转数转动并且将转数

输出到确定装置 12。

下面描述根据这个实施例具有上述结构的盘唱机的操作。图 2 表示盘 1, 数字 1a 表示其上的信号记录内圆边缘。光拾取器 4 在盘重放的开始之前到达盘 1 的信号记录内圆边缘 1a 并且随后沿径向移动到盘 1 的圆周。在移动过程中, 光拾取器 4 读盘 1 的信息。数字 1b 表示具有小直径的盘的圆周边缘(如, 直径 8cm)和数字 1c 表示具有大直径(如, 直径 12cm)的盘的圆周边缘。其上不具有记录信息的镜面部分 1d, 1e 分别位于具有上述直径的盘的圆周边缘 1b, 1c 的信号记录内圆边缘一侧。信息记录部分 1f, 1g 位于镜面部分 1d, 1e 的信号记录内圆边缘更进一侧。

图 3 表示为按照这个实施例在启动时间时所进行的操作的流程图。这个流程图不仅将光拾取器 4 移动到盘 1 的信号记录内圆边缘而且确定盘 1 是否设置在转盘 3 上及所设置的盘 1 的直径尺寸。当启动信号 A 输入控制装置 10 时, 开始这个流程图并且根据启动信号 A 盘电机 2 以给定的转数转动。

控制装置 10 输出控制信号到光拾取器 4 以使光拾取器 4 发射激光光束(步骤 S1)。然后, 控制装置 10 输出控制信号到驱动电路 9 使可移动支架 5 暂时移动到盘 1 的圆周从而沿同样方向整体移动光拾取器 4(步骤 S2)。在输入启动信号的早期阶段中在给定的一段时间(即, 0.5 秒)内使光拾取器 4 移动到盘 1 的圆周。移动之后, 光拾取器 4 进行聚焦搜索并且由此输出信号到控制装置 10 的输入确定部分 11(步骤 S3)。

输入确定部分 11 根据该信号确定盘 1 的反射光是否入射到光拾取器 4(步骤 S4)。步骤 S4 不读盘 1 的记录信息仅仅确定光拾取器

4 是否接收盘 1 的反射光。当光拾取器 4 接收盘 1 的反射光时,转向步骤 S5。另一方面,当光拾取器 4 未接收反射光时,进到步骤 S6。

步骤 S6 确定在给定的时间内仍未接收到盘 1 的反射光的状态是否继续。当在给定的时间或更长的时间内继续仍未接收到反射光时,输入确定部分 11 确定盘 1 未被设置在转盘 3 并且根据这种确定,控制装置 10 输出对于这种状态的警告,结束启动状态并等待下一个启动信号的输入(步骤 S7)。该结构根据光拾取器 4 的信号检测是否设置盘 1,因此不必提供用于检测设置是否有效的传感器。这样,可以减少部件数目,简化盘唱机的结构及由此简化控制系统。

另一方面,在给定的时间内当盘 1 的反射光被接收时,输入确定部分 11 确定盘 1 设置在转盘 3 上,这样,控制装置 10 移动光拾取器 4 到盘 1 的信号记录内圆边缘(步骤 S8),并且返回步骤 S3 继续到步骤 S5。

步骤 S5 是已经检测到盘 1 设置在转盘 3 之后的步骤。控制装置 10 使光拾取器 4 的聚焦伺服为闭合状态。随后,在步骤 S9,使其他的伺服控制如跟踪伺服和盘电机伺服都为闭合状态。

上述的闭合状态的伺服控制使光拾取器 4 读盘 1 的记录信息,确定装置 12 确定信息的读取是否为适宜的(步骤 S10)。在该阶段,光拾取器 4 的信号输出到读出部分 13 并将读出部分 13 的结果输出到确定装置 12。当读出部分 13 根据光拾取器 4 的信号读盘 1 的信息时,转向步骤 S12。另一方面,当读出部分 13 没有读信息时,转向步骤 S11。当读出部分 13 不读盘 1 的信息时,光拾取器 4 不位于对应盘 1 的信息记录部分 1f 或 1g 的位置,即,位于对应镜面部分 1d 或 1e 的位置。这样,控制装置 10 进一步移动光拾取器 4 到盘 1 的信号

记录内圆边缘(步骤 S11)并返回步骤 S10。

另一方面,当盘 1 的信息在步骤 S10 被读取时,确定装置 12 确定光拾取器 4 相对盘 1 的当前位置。当盘为 CD 时,这种确定按下面进行。例如,在 CD 中,读信息包括工作时间信息,因此根据工作时间信息可以计算光拾取器的当前位置。

在光拾取器相对盘 1 的当前位置确定之后转向步骤 S13,在这里决定是否要确定盘 1 的直径。当需要时,转向步骤 S17,反之,当不需要时,转向步骤 S14。步骤 S14 是已经输入盘 1 的直径或仅使用单一直径的盘 1 的情况。在这两种情况中,已知盘 1 的直径。在步骤 S14,确定装置 12 计算光拾取器 4 移动到盘 1 的信号记录内圆边缘所需的时间。根据相对盘 1 的光拾取器 4 的当前位置数据通过计算正比于其结果的时间来完成该操作,在步骤 S12 确定光拾取器 4 相对盘 1 的当前位置。确定装置 12 输出这种计算的移动时间到控制装置 10。控制装置 10 根据其来控制驱动电路 9 并在该时间内移动光拾取器 4 到盘 1 的信号记录内圆边缘(步骤 S15)。这样,光拾取器 4 到达盘 1 的信号记录内圆边缘 1a,这样以开始重放盘 1 的信息为结果结束启动状态(步骤 S16)。

另一方面,当需要确定盘 1 的直径时,转向步骤 S17。在步骤 S17,确定装置 12 将步骤 S12 中已经确定的光拾取器 4 的当前位置数据和盘唱机使用的各种盘中具有最小直径的盘的圆周位置数据 m 进行比较。作为这种比较的结果当发现当前位置数据大于 m 时,确定装置 12 确定使用的盘为大直径盘(步骤 S18),随后,转向步骤 S14。

反之,当光拾取器 4 的当前位置数据小于 m 时,转向步骤 S19。在步骤 S19,确定装置 12 根据光拾取器 4 的当前位置数据和 m 值执

行算术运算(m -当前位置),计算与算术运算结果成正比例的移动时间并将计算的时间输出到控制装置 10。这样,控制装置 10 控制驱动电路 9 从而移动光拾取器 4 仅在该时间内到达盘 1 的圆周(步骤 S20)。作为移动到盘 1 的圆周的结果输入确定部分 11 确定光拾取器 4 是否接收盘 1 的反射光(步骤 S21)。当接收反射光时,确定装置 12 确定盘 1 具有大直径(步骤 S18)。反之,当光拾取器 4 没有接收盘 1 的反射光时,确定装置 12 确定盘 1 具有小直径(步骤 S22)。这样,确定盘 1 的直径,使步骤从步骤 S18 和步骤 S22 转向步骤 S14,执行上述的同样算术运算并且随后光拾取器 4 移向盘 1 的信号记录内圆边缘(步骤 S15),从而结束启动状态(步骤 S16)。

因此,在该实施例中,无论光拾取器定位在何处它能够准确到达盘的信号记录内圆边缘。这样,不必设置用于检测到达盘的信号记录内圆边缘的检测开关,因此不但简化盘唱机的结构而且使其装配简单。此外,在该实施例中,也确定了盘的直径尺寸,因此不必设置用于该目的的检测传感器,从而使盘唱机的结构进一步简化。

本发明并不局限该实施例并且可以作出各种修改。例如,在该实施例中,通过移动光拾取器到盘的信号记录内圆边缘可以令人满意地简化盘唱机的结构,从而避免确定盘的直径和盘的设置。

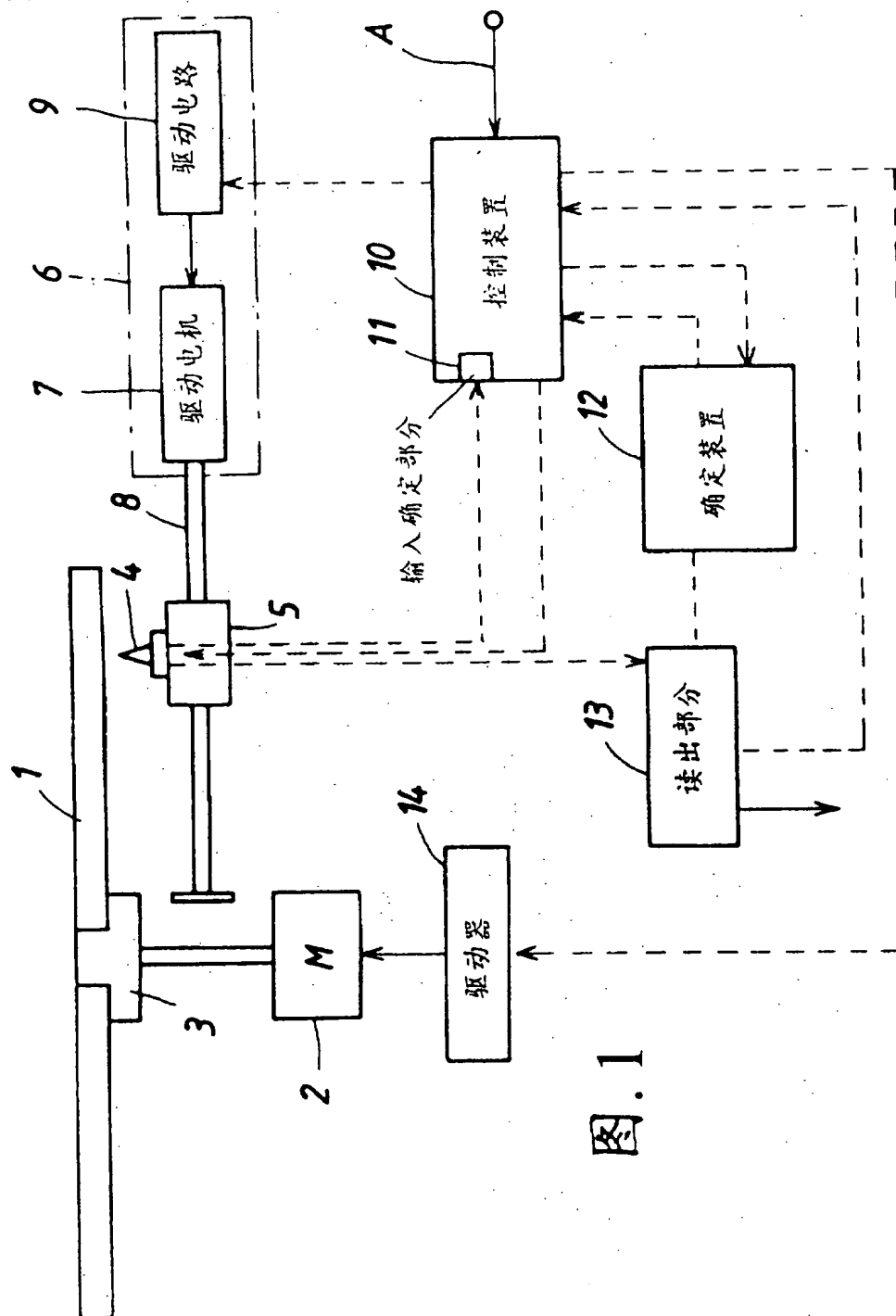


图. 1

图.2

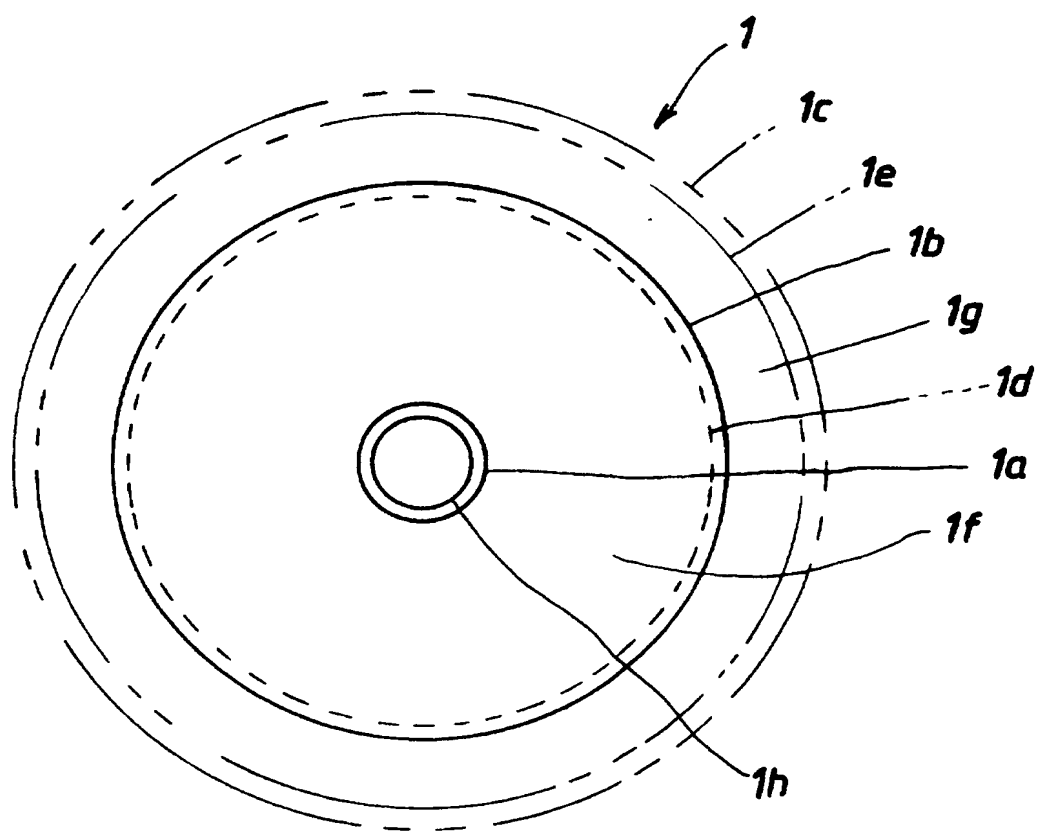
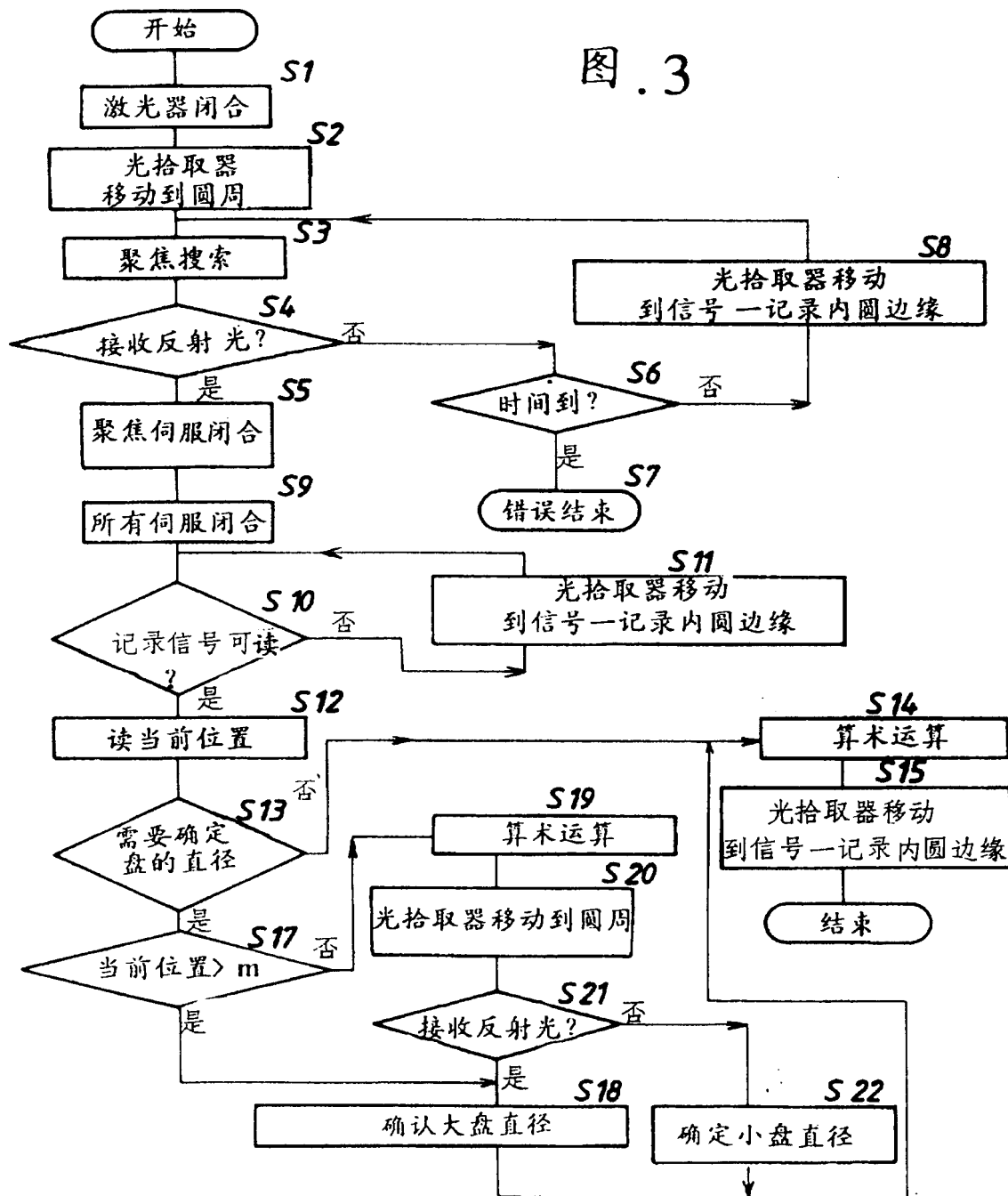


图.3



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